INTRAVENOUS CATHETER AND INSERTION DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a device for the insertion of a flexible catheter into a vein of a patient for intravenous administration of fluids. More Particularly the invention relates to devices wherein the flexible catheter is inserted into the vein has a sharp needle about which the catheter is snugly mounted, and the needle and catheter are inserted into the vein and the needle removed leaving the catheter in place. Most particularly the invention relates to a catheter insertion device wherein the insertion needle is retractable into the device after removal and a removable cap is placed over the insertion end of the catheter insertion after use to prevent accidental needle prick and a resealable seal is placed over the insertion end to prevent bodily fluids from exiting the insertion device.

2. Related Art

The development of flexible intravenous catheters has greatly increased the comfort of patients during intravenous administration of medicinal fluids. The flexible catheter prevents unwanted puncture of the vein. The flexible catheter normally consists of a narrow tube of NYLON or TEFLON construction with a rigid member attached at the rear end for connection to the source of fluid to be administered.

Because the catheter is flexible it cannot by itself be inserted into the vein. Therefore, the catheter is snugly nested about a sharp needle which can be inserted into the vein. After insertion the sharp needle is withdrawn leaving the catheter in place for connection to the fluid source. The insertion needle is simply discarded as it is intended for a single use only. Often the needle is discarded in a careless manner leaving the

exposed needle point as a hazard.

Accidental needle prick has been a problem for years in the health care industry. However, the advent of the HIV or AIDS virus has focused attention on the problem. While several diseases, such as viral hepatitis, may be contracted from bodily fluids of infected persons, HIV has caused the most concern because to date no preventative or cure is known. Protection against accidental needle prick is expected to remain a concern even after a vaccine or cure is found, an ounce of prevention being worth a pound of cure.

My earlier U.S. patents 5,019,019 and 5,176,650 have addressed this problem in regard to catheter insertion devices. However there has remained the possible exposure to the patient's bodily fluid (blood) after the needle has been removed.

SUMMARY OF THE INVENTION

To protect against accidental needle prick a catheter and insertion device are provided wherein the needle is retractable within the device after insertion of the catheter. The device comprises a hollow barrel or tube of semi-rigid plastic material into which the needle can be retracted after use. The insertion needle is mounted on a carrier with the sharp end oriented toward the insertion end of the barrel with the catheter snugly fit about the needle. A sliding tab is mounted to the carrier by an outwardly biased flexible member and extends through a longitudinal slot in the barrel. Near either end of the slot V notches are provided in the internal wall of the barrel to engage locking hubs on the sliding tab to releasably lock the carrier in either the exposed or retracted position. A flat catheter locking surface is provided at the insertion end of the barrel with a reverse slope to allow the catheter flange to slide onto the flat surface and allow easy retraction of the needle without disturbing the inserted catheter. A resealable closure is located over the insertion

end to allow passage of the catheter and carrier and then close when the carrier and needle are retracted. The closure prevents any bodily fluids from exiting the barrel after use. The catheter insertion device is shipped with a removable cap over the end with is replaced after the insertion needle has been retracted into the hollow barrel. The cap covers the length of the longitudinal slot to prevent bodily fluids from exiting through the slot.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view in cross section showing the catheter insertion device with the needle and catheter in the retracted position.

FIG. 2 is a side elevational view if cross section showing the needle and catheter in the exposed position.

FIG. 3 is a top view of the catheter insertion device the needle and catheter in the exposed position.

FIG. 4 is a side elevational view in cross section showing the needle retracted from the catheter.

FIG. 5 is a perspective view of the sliding tab showing one of the locking tabs for locking the carrier in the exposed or retracted position.

FIG. 6 is a side elevational view in cross section showing the catheter insertion device as shipped with a removable cap over the insertion end.

FIG. 7 is a side elevational view is cross section showing the catheter insertion device showing the removable cap replaced after the catheter has been inserted and the insertion needle retracted into the barrel.

FIG. 8 is a front view taken along line 8-8 of FIG. 1 showing the resealable closure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a detailed description of the preferred embodiment the reader is referred to the appended figures in which like components are given like numerals for ease of reference.

FIG. 1 generally shows a catheter insertion device **1** having a hollow cylindrical barrel **10** of semi-rigid plastic material. The barrel **10** may be tapered slightly at the insertion end for ease of use. For orientation purposes the barrel **10** is defined as having an insertion end **11** and a distal end **12**. A flexible catheter **20** is snugly fit about an insertion needle **40** and both mounted on a carrier **50** which is slidably mounted within the barrel **10**. In FIG. 6 the device is depicted as proposed to be shipped with the carrier **50**, needle **40** and catheter **20** withdrawn into barrel **10** and a removable cap **120** secured about the insertion end. A resealable closure comprising **111A** and **111B** is shown near the insertion end. Shipment will be in a sterile package (not shown). In this configuration no protective sheath about the needle **40** and catheter **20** is required as in other catheters because they are encased by the barrel **10** and cap **120**.

In FIG. 2 the device is depicted with the cap removed and the needle **40** and catheter **20** exposed for insertion into the vein of the patient. Flap **111A** of resealable closure is shown open allowing the needle **40** and catheter **20** to pass there through. FIG. 3 is an overall depiction with the device rotated 90° about its longitudinal axis clearly showing the sliding slot **90** in the barrel **10**. FIG. 4 depicts the device with the needle **40** retracted into the barrel **10** leaving the catheter **20** in place. FIG. 7 depicts the removable cap **120** placed over the insertion end and extending to cover the slot **90**. FIG. 5 depicts the sliding tab **60** in enlarged detail.

Referring now in particular to the barrel **10** as depicted in FIG.'s 1-4, it is shown to have a longitudinal slot **90** partially extending between the two ends **11** and **12**. Near either end of the slot are circumferential V notches **81** and **82** a shown. Additionally, at the insertion end there is provided an inwardly projecting circumferential shoulder **70** having a rear surface **71** sloped radially outwardly toward the distal end **12** and a flat surface **72** facing the insertion end **11**. The resealable closure **111A, 111B** is shown just inside the insertion end. As seen better in FIG. 8 the resealable closure **111** is seen to comprise two semicircular pieces **111A** and **111B** of elastic material which overlap to seal the end of the barrel. The flaps **111A** and **111B** may be forced apart and open by the needle **40** and catheter **20** but reclose when the needle **40** is withdrawn within the barrel.

Referring again to FIG.'s 1-4, the needle carrier **50** is slidably mounted within the barrel **10** having the sliding tab **60** mounted thereto by base **65** and flexible member **62** which biases the tab outward to extend through slot **90**. Referring now to FIG. 5 the tab **60** is shown to have V topped hubs **63** and **64** on either side (only one shown in FIG. 5). As member **62** biases tab upward V topped hubs are forced into releasable locking engagement with either of V shaped notches **81** or **82**.

As may be more easily seen in FIG. 4 the insertion needle **40** is mounted to carrier by mounting post **51** which includes a forward projecting frusto-conical section **52**. Normally the longitudinal axis of the needle **40** will be aligned with the longitudinal axis of the barrel **10**. The flexible catheter **20** is mounted snugly about the insertion needle **40** with the sharp point **41** of needle extending from the catheter end **21**. Catheter **20** includes a hollow base having two frusto-conical sections **30** and **31**. In particular frusto-conical

section **31** is nested over needle base section **52**. At the rear or distal end of catheter base **30** a circumferential flange **110** extends outward the outer diameter of which is slightly greater that the inner diameter of barrel shoulder **70**.

In use, the catheter and insertion device are removed from their sterile packaging with the needle carrier **50**, needle **40** and catheter **20** in the retracted position, the carrier **20** being locked into the retracted position by engagement of the V topped hubs **63** and **64** with rear V notch **82**. The user removes the cap **120** and presses down (or inwardly) on tab **60** to release the hubs **63** and **64** from the rear notch **82** and slides the carrier **50** with the needle **40** and catheter **20** forward toward the insertion end. The needle **40** and catheter pass through resealable closure **111**, and the flange **110** passes over the sloped surface **71** and engages surface **72** at the same time as the hubs **63** and **64** engage the front notch **81**. The catheter **20** may then be inserted into the patient's vein. The user again presses downward on the tab **60** to release the hubs **63** and **64** from the front V notch **81** and slides the carrier and needle toward the distal end, the engagement of the flange **110** against the flat surface **72** prevents the catheter **20** from also being retracted leaving it in place. As the needle **40** is retracted the resealable closure **111** recloses. The needle is locked into the retracted position by the biasing force of flexible member **62**. The cap **120** is replaced and the whole assembly discarded with the needle **40** encased by the barrel **10** and cap **120**. A small clearance **73** between flange **110** and shoulder **70** prevents the catheter **20** from sticking within the end **11** of the barrel **10**. Alternatively, the insertion may be withdrawn from the catheter **20** and then the needle **40** retracted. The barrel is sealed by the resealable closure **111** and cap **120**.